



Understanding Roadside Swales

Roadside swales have multiple functions.

A major function is to maintain a dry roadbed. Keeping the centerline of the swales at least 1.1 feet below the centerline of the roadway helps to keep the roadbed above the water-table. This helps to make the road last longer.

Another function is to store run-off from the roadway to mitigate the effect of the impervious surface of the roadway. The immediate function of the swale in a rainfall event is to clear the roadway of stormwater. This is why the road is crowned 3% and there is an 8-10% slope from the edge of pavement to the center of the swale.

Florida is essentially a flat state with a soil that readily absorbs stormwater into the freshwater aquifer. Allowing this gift of fresh water to go directly into a ditch or canal without the time to soak into the ground would deplete the shallow aquifer or allow it to become saline. That is why storage is such an important part of the swale system.

Another function of the swale is to convey excess stormwater to an outfall structure, ditch or freshwater canal. This is the case during the high flow conditions of a significant rainfall event.

In order to understand the relationship between these multiple functions it is useful to identify the four states of the swale.

1. Dry
2. Puddling
3. Low flow
4. High flow.

In the first state, the swale is dormant. This is the condition during a dry period, with a low water table.

The second state is where there is some residual water left in the swale. This is normal because the storage water is being absorbed into the ground. This is typical for periods of three days to a week after a rainfall event. The water stays in the swale until the water table subsides enough to absorb the water. This is also the way small amounts of water used for irrigation are meant to be handled.

The third state is typical for the first three days after a rainfall event. There will be a low velocity flow along the swale in the general direction of the outfall. Usually only the center of the water will show any movement. It takes a long time for the surface vegetation to release all of the rain water gathered during a rain, so it seems to just keep coming even though there is no readily identifiable source. In some cases the flow will continue indefinitely as long as the water table is high enough to supply the flow.

The fourth state is the one that demonstrates the systems ability to remove Stormwater at the full capacity for which it was designed. The swale capacity has been calculated to handle certain statistical rainfall events efficiently and quickly. Most of this flow will be finished within an hour after the storm has stopped. The conditions will then return to the third state.

When there has been no rain for several days and there is a significant amount of standing water in the swale there may be a blockage downstream of the area. This warrants investigation by an inspector. The inspector will determine what has caused the blockage. Stormwater Engineering will determine if a remedy is required on a case by case basis.

In other cases the water may not have had enough time to be absorbed before another rainfall event has occurred. This is an acceptable condition and does not place the resident in any danger of flooding just because the swale has not emptied. Most of the reserve flow capacity remains even when the swale is in the storage condition. So there is little reason to worry.